

Serial No.: 10/614,609

### **Amendments to the Claims**

This listing of claims will replace all prior versions and listings of claims in the application:

#### **Listing of Claims:**

1. (Original) A method for hydrogen production comprising the steps of:

introducing a feedstock comprising at least one biodegradable solid into a first stage anaerobic bioreactor and forming a liquid effluent;

transferring said liquid effluent into a second stage anaerobic bioreactor having a plurality of hollow semipermeable fibers having an outer surface coated with a biofilm comprising at least one hydrogenogenic bacteria, forming hydrogen within lumen of said hollow semipermeable fibers; and

removing said hydrogen from within said lumen of said hollow semipermeable fibers.

2. (Original) A method in accordance with Claim 1, wherein said first stage anaerobic bioreactor is operated with substantially zero headspace.

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3. (Original) A method in accordance with Claim 1, wherein a retention time for said feedstock in said first stage anaerobic bioreactor is sufficiently short whereby establishment of methanogenic bacteria in said first stage anaerobic bioreactor is substantially prevented.

4. (Original) A method in accordance with Claim 1, wherein said first stage anaerobic bioreactor is operated under thermophilic conditions.

5. (Original) A method in accordance with Claim 4, wherein said first stage anaerobic bioreactor is operated at a temperature in a range of about 45°C to about 65°C.

6. (Original) A method in accordance with Claim 1 further comprising adding a methanogenic bacteria specific chemical inhibitor to said second stage anaerobic bioreactor.

7. (Original) A method in accordance with Claim 1, wherein said second stage anaerobic bioreactor is maintained at a hydraulic retention time in a range of about 24 hours to about 48 hours.

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8. (Original) A method in accordance with Claim 1, wherein CO<sub>2</sub> is formed in said lumen from which it is transmitted through a CO<sub>2</sub> scrubber system whereby said CO<sub>2</sub> is recovered.

9. (Original) A method in accordance with Claim 1, wherein said first stage anaerobic bioreactor generates biosolids.

Claims 10-16 (withdrawn)